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10/551,606	01/17/2007	Gotz Burgfels	P-1271	2879
68072 7590 03/17/2010 SCOTT R. COX LYNCH, COX, GILMAN & MAHAN, P.S.C. 500 WEST JEFFERSON STREET SUITE 2100 LOUISVILLE, KY 40202				
EXAMINER JOHNSON, KEVIN M				
ART UNIT 1793		PAPER NUMBER		
NOTIFICATION DATE 03/17/2010		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/551,606

Applicant(s)

BURGFELS ET AL.

Examiner

KEVIN M. JOHNSON

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-28 and 35-63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-28 and 35-63 is/are rejected.
- 7) ☒ Claim(s) 58 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The amendment to the specification submitted 12/22/2009 is acknowledged.

Claim Objections

3. Claim 58 objected to because of the following informalities: "hydrogenating" is not correct. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 16-19, 21-28, 35-48, 50, 51 and 53-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katovic et al. (Chemistry Express, 1991, Vol. 6, No. 12, pp. 969-972) in view of Rosinski et al (US 3832449), Kuhl (US 4552739) and Kresge et al. (US 4599475).

In regard to claim 16, Katovic teaches a method of synthesizing ZSM-12 zeolites. The method comprises mixing an aluminum source, a sodium source, precipitated silica as a silicon source, water and TEABr to form a hydrogel system. The hydrogel is crystallized under static conditions at autogeneous pressure in autoclaves (p. 969). The solid produced was ZSM-12 zeolite. Katovic only contemplates a single $\text{H}_2\text{O}:\text{SiO}_2$ molar ratio of 20 (abstract). The required $\text{H}_2\text{O}:\text{SiO}_2$ molar ratio is not disclosed by Katovic, and Katovic is silent as to the properties of the produced ZSM-12 zeolite. The surface area of the precipitated silica employed in the process is not disclosed by Katovic, but it is disclosed that the particle size and associated surface area of the reagents used is important (p. 971). Stirring the mixture during the crystallization process is not disclosed by Katovic.

Rosinski discloses a method for producing ZSM-12 zeolite. In an exemplary embodiment of the process an $\text{H}_2\text{O}:\text{SiO}_2$ molar ratio of 13.5 was employed in the reaction mixture (example IV).

Kuhl teaches that when crystallizing ZSM-12 zeolites the reaction mixture may be either static or stirred (column 3, lines 31-32).

Kresge teaches that precipitated silicas with surface areas of $140\text{-}160\text{ m}^2/\text{g}$ are particularly preferred for the production of ZSM type zeolites (column 9, lines 18-22). Precipitated silicas with surface areas of $140\text{-}160\text{ m}^2/\text{g}$ are considered to have unusually high surface areas (column 9, lines 18-22).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a $\text{H}_2\text{O}:\text{SiO}_2$ molar ratio in the range required by the claims in the reaction mixture disclosed by Katovic. Such a modification would have been motivated by the teaching in Rosinski that ZSM-12 reaction mixtures may utilize $\text{H}_2\text{O}:\text{SiO}_2$ molar ratios of 13.5 (example IV). It would have been obvious to one of ordinary skill in the art at the time of the invention to stir the ZSM-12 reaction mixture utilized by Katovic during the crystallization process. Such a modification would have been motivated by the teaching in Kuhl that ZSM-12 reaction mixtures may be stirred during crystallization (column 3, lines 31-32). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize precipitated silica with a surface area of less than $200\text{ m}^2/\text{g}$ in the process disclosed by Katovic. Such a modification would have been motivated by the teaching in Kresge that precipitated silicas with surface areas of $140\text{-}160\text{ m}^2/\text{g}$ are particularly preferred for the production of ZSM type zeolites and that

precipitated silica with surface areas of 140-160 m²/g are considered to have unusually high surface areas. Katovic fails to disclose that the precipitated silica has unusual properties and so one of ordinary skill in the art when considering the disclosure of Kresge would not expect the precipitated silica employed by Katovic to have a surface area in excess of 160 m²/g. As the process disclosed by the prior art meets all the limitations of the process in the instant claim, and utilizes the same materials, the zeolite produced by the process would necessarily exhibit the properties required by the instant claim.

In regard to claim 17, Katovic discloses a M_{2n}O:SiO₂ ratio of 0.1 (sample 4).

In regard to claim 18, Katovic discloses a SiO₂:Al₂O₃ ratio of 100 (sample 4).

In regard to claim 19, the crystallization in the process disclosed by Katovic occurs at 150-170°C (p. 969).

In regard to claim 21, Katovic discloses a crystallization time of 6 days, or 144 hours (fig. 10).

In regard to claim 22, Rosinski teaches that the solid is washed, dried and calcined at 1000°F (example IV). The calcination takes place over a period of 5 hours (example I).

Kuhl teaches that the dried zeolite product is sized prior to calcination at 600°C (example 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to wash, dry, comminute and then calcine the solid produced by the process as required by the instant claims. Such a modification would have been motivated by

the teaching in Rosinski that the solid may be washed, dried and calcined for a period of 5 hours (example I), and the teaching in Kuhl that the solid ZSM-12 product may be sized, or comminuted, prior to calcination at 600°C (example 2).

In regard to claim 24, Rosinski teaches that the material may be ion exchanged with an aqueous solution of ammonium chloride, and then calcined (example IX).

Kuhl teaches that after ion exchanging the material it is washed, dried and then calcined (examples 2 and 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to ion exchange the material with an ammonium compound, and then wash, dry and calcine the resulting product. Such a modification would have been motivated by the teaching in Rosinski that the material may be ion exchanged with an aqueous solution of ammonium chloride, and then calcined (example IX), and the teaching in Kuhl that after ion exchanging the material it is washed, dried and then calcined (examples 2 and 3).

In regard to claim 25, Rosinski teaches that ZSM-12 zeolites may be molded, by methods including extrusion (column 6, lines 11-14).

In regard to claim 26, Rosinski discloses that a binder may be added to the zeolite material to form a composite. The aluminosilicate preferably accounts for 20-50 wt-% of the resulting composite (column 6, line 63 - column 7, line 2). The binder would then account for 50-80 wt-% of the composite material.

In regard to claims 27 and 28, Rosinski teaches that a form of the ZSM-12 product that incorporates platinum is particularly useful (column 3, line 61 – column 4, line 22).

In regard to claims 35-41, the process of the prior art, Katovic, Rosinski and Kuhl, is the same as the process utilized to produce the zeolite product of the instant claims, and therefore would necessarily produce the same product. For a detailed discussion of the synthesis process see the rejection of claims 16-28.

In regard to claim 42, Rosinski teaches that the ZSM-12 zeolite may be employed as a catalyst for the conversion of organic compounds (column 4, lines 23-25).

In regard to claim 43, Rosinski teaches that ZSM-12 zeolites may be molded, by methods including extrusion (column 6, lines 11-14). It would have been obvious to one of ordinary skill in the art at the time of the invention that the extruded material may be considered to be in lump form.

In regard to claim 44, Rosinski discloses that a binder may be added to the zeolite material to form a composite. The aluminosilicate preferably accounts for 20-50 wt-% of the resulting composite (column 6, line 63 - column 7, line 2). The binder would then account for 50-80 wt-% of the composite material.

In regard to claims 45-48, Rosinski teaches that a form of the ZSM-12 product that incorporates platinum is particularly useful as a catalyst (column 3, line 61 – column 4, line 22).

In regard to claim 50, Rosinski teaches a method for converting an organic feed stream by charging the feed stream over a catalyst containing a ZSM-12 type zeolite (example X).

In regard to claims 51, 54 and 55, Rosinski teaches a process for the hydroisomerization of normal paraffins utilizing the ZSM-12 catalyst. The process takes place at a temperature of 300-550°F, with a liquid hourly space velocity of 0.01-2 in the presence of hydrogen (column 7, lines 30-35). The pressure at which the process is performed is not disclosed, and is therefore considered to be atmospheric pressure. The hydroisomerization of higher paraffins is not expressly disclosed. A process for the production of olefins from straight chain hydrocarbon compounds produces a significant amount of C₅⁺ gasoline and therefore the organic feed stream must contain higher paraffins (example X and XII).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the hydroisomerization treatment disclosed by Rosinski to treat higher paraffins. Such a modification would have been motivated by the teaching in Rosinski that the process is useful for the treatment of normal paraffins, and that the zeolite catalyst is useful for the treatment of straight chain compounds with a chain length greater than C₅ (examples X and XII).

In regard to claim 53, Rosinski teaches that the catalyst may be used for aromatic hydroisomerization (column 7, lines 36-38).

In regard to claims 56-62, Rosinski teaches that the catalyst may be used in processes for reforming hydrocarbons, reduction of pour points of paraffinic charge

stocks, polymerization of olefins or acetylinic hydrocarbons, alkylation of hydrocarbons, dehydration/hydration of organics and dehydrogenation of organics (column 3, lines 5-23). A catalyst comprising a ZSM-12 material may also be employed in a process for the desulfurization of organics (column 7, lines 44-47).

In regard to claim 63, Kuhl discloses that ZSM-12 based catalysts may be utilized in processes for the conversion of alcohols to hydrocarbons (column 5, lines 36-42).

8. Claims 20 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katovic, Rosinski, Kuhl and Kresge as applied to claims 16 and 45 above, and further in view of Sumitani et al. (US 4557919).

In regard to claim 20, Katovic, Rosinski, Kuhl and Kresge fail to teach the extent of the washing process.

Sumitani discloses a process for producing ZSM-12 zeolites in which the produced zeolites are washed with pure water until the ion conductivity of the wash water is less than 50 $\mu\text{S}/\text{cm}$ (column 8, lines 40-43).

It would have been obvious to one of ordinary skill in the art at the time of the invention to wash the material produced by Katovic, Rosinski, Kuhl and Kresge with water until the conductivity of the wash water was in the range required by the instant claim. Such a modification would have been motivated by the teaching in Katovic, Rosinski and Kuhl that the zeolite product is washed and the disclosure in Sumitani that ZSM-12 zeolites are preferably washed with pure water until the ion conductivity of the wash water is less than 50 $\mu\text{S}/\text{cm}$ (column 8, lines 40-43).

In regard to claim 49, Katovic, Rosinski and Kuhl fail to disclose the amount of catalytically active component contained in the catalyst.

Sumitani discloses a platinum containing catalyst, where the platinum accounts for 0.01-5 wt-% of the catalyst composition (column 11, lines 22-25).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a catalytically active component in the amount required by the instant claim. Such a modification would have been motivated by the teaching in Sumitani that ZSM-12 containing catalysts beneficially contain a catalytically active component, such as platinum, in an amount of 0.01-5 wt-% of the catalyst composition (column 11, lines 22-25).

9. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katovic, Rosinski, Kuhl and Kresge as applied to claim 51 above, and further in view of Monque et al. (US 5576256).

In regard to claim 52, Katovic, Rosinski, Kuhl and Kresge fail to disclose the use of n-octane in a hydroisomerization process.

Monque discloses a hydroisomerization process that utilizes a ZSM-12 containing catalyst (column 3, lines 36-40) and for the treatment of an n-octane feed stream (column 7, lines 56-59).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize an n-octane feed stream in the hydroisomerization process disclosed by Katovic, Rosinski and Kuhl. Such a modification would have been motivated by the

teaching in Monque that ZSM-12 containing catalysts, the type utilized by Katovic, Rosinski and Kuhl, are especially suited for the treatment of n-octane.

Response to Arguments

10. Applicant's arguments filed 12/22/2009 have been fully considered but they are not persuasive.

The argument that one ordinary skill in the art at the time of the invention would not have been motivated to combine Katovic and Rosinski due to their use of different silica sources is not persuasive. Katovic is silent as to $\text{H}_2\text{O}:\text{SiO}_2$ molar ratios other than 20 for use in the process of producing a ZSM-12 material (abstract). Rosinski was cited for the teaching that ZSM-12 may be produced utilizing synthesis mixtures with a $\text{H}_2\text{O}:\text{SiO}_2$ molar ratios other than the single ratio disclosed by Katovic, such as 13.5 (example IV). Katovic discloses that precipitated silica is the preferred silica source for use in the synthesis process, but ZSM-12 is produced when either colloidal or precipitated silica are utilized (examples 1 and 3-5). Precipitated silica is disclosed to have the advantage of avoiding the co-crystallization of ZSM-5 with ZSM-12 observed when utilizing colloidal silica in the process. One of ordinary skill in the art would therefore expect general teachings of the process disclosed by Rosinski that employs colloidal silica, such as possible $\text{H}_2\text{O}:\text{SiO}_2$ molar ratios, to apply to the process disclosed by Katovic. The use of different silica precursors is not sufficient to establish the processes of Katovic and Rosinski as exactly opposite for the purposes of producing ZSM-12.

The references are not in conflict with regard to the $\text{H}_2\text{O}:\text{SiO}_2$ molar ratio as asserted by applicant. Katovic is completely silent as to $\text{H}_2\text{O}:\text{SiO}_2$ molar ratios other than 20 that may be used to produce ZSM-12, this silence is not equivalent to a teaching that other $\text{H}_2\text{O}:\text{SiO}_2$ molar ratios will not successfully produce ZSM-12. Rosinski provides evidence, utilization of $\text{H}_2\text{O}:\text{SiO}_2$ molar ratios other than 20 to produce ZSM-12, that would suggest to one of ordinary skill in the art at the time of the invention that $\text{H}_2\text{O}:\text{SiO}_2$ molar ratios in the range required by the instant claims could be employed in the process disclosed by Katovic.

The new grounds of rejection based on Kresge have been necessitated by the newly added limitation in the instant claims that the precipitated silica has a BET surface area of less than $200 \text{ m}^2/\text{g}$.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN M. JOHNSON whose telephone number is (571)270-3584. The examiner can normally be reached on Monday-Friday 9:00 AM to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kevin M Johnson/
Examiner, Art Unit 1793

/David M Brunsman/
Primary Examiner, Art Unit 1793